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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/875,619 | 06/06/2001 | Michael J. Dixon | 27754/21720 | 7775 |
| 4743 | 7590 | 07/12/2005 | EXAMINER | |
| MARSHALL, GERSTEIN & BORUN LLP 233 S. WACKER DRIVE, SUITE 6300 SEARS TOWER CHICAGO, IL 60606 | | | LIANG, LEONARD S | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2853 | |

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------|--------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/875,619 | DIXON ET AL. |
| | Examiner | Art Unit |
| | Leonard S. Liang | 2853 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 16 June 2005.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-7,35-37 and 65 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) 1-3,35-37 and 65 is/are allowed.
 6) Claim(s) 4-7 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 01 June 2001 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.
 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____.
 5) Notice of Informal Patent Application (PTO-152)
 6) Other: _____.

DETAILED ACTION***Specification and Drawings***

The lengthy specification and drawings have not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification and drawings. Specifically, the applicant is required to match all references in the specification with references in the figures.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rezanka (US Pat 5818485) in view of Williams (US Pat 5602574).

Rezanka discloses:

- {claim 4} Droplet deposition apparatus (figure 1); an array of fluid chambers, each chamber communicating with an orifice for droplet ejection, a common fluid inlet manifold and a common fluid outlet manifold (figure 1-2, reference 16, 18); each chamber so connected with the inlet manifold and the outlet manifold as to enable a fluid flow from the inlet manifold, through each chamber in the array and into the outlet manifold, the fluid flow through each chamber being simultaneous with droplet ejection from the orifice and being sufficient to prevent foreign bodies in the fluid from lodging in the orifice (figure 1-2; abstract; column 1-2; column 3, lines 15-40); the resistance to flow of one of the inlet and outlet manifolds being chosen such that the pressure at a fluid

inlet to any chamber in the array varies between any two chambers by an amount less than that which would give rise to significant differences in droplet ejection properties between the two chambers in the array (abstract; column 1-2; column 3, line 54-column 4, line 18)

- {claim 5} wherein the cross-sectional area of at least one of the inlet and outlet manifolds is such that the pressure varies between any two chambers by an amount less than that which would give rise to significant differences in droplet ejection properties between the two chambers in the array (abstract; column 1, line 35-column 2, line 38; column 3, line 54-column 4, line 18)
- {claim 6} wherein the array of chambers is linear
- {claim 7} wherein the array is angled to the horizontal and the inlet manifold extends parallel to the array, the properties of the inlet manifold varying in a direction lying parallel to the array in such a way as to substantially match the rate of pressure loss along the inlet manifold due to viscous losses in the inlet manifold to the rate of increase of static pressure along the inlet manifold due to gravity (figure 1, reference 18; abstract; column 1, line 35-column 2, line 38; column 3, line 54-column 4, line 18)

Rezanka differs from the claimed invention in that it does not disclose:

- {claim 4} a piezoelectric actuator associated with each chamber for droplet ejection

Williams discloses:

- {claim 4} that an ejection mechanism can take on a variety of forms, such as thermal printhead or piezoelectric; thus Williams teaches that piezoelectric and thermal technologies can serve as equivalent replacements for each other

It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the thermal actuator of Rezanka with a piezoelectric actuator. The motivation for the skilled artisan in doing so is to gain the benefit of producing sharper images.

Allowable Subject Matter

Claims 1-3, 35-37, and 65 are allowed.

The following is an examiner's statement of reasons for allowance: The applicant's amendments with respect to "wherein the flow through each chamber is at least ten times greater than the maximum fluid flow of droplets ejected through the orifice of the chamber..." is persuasive. However, this amended limitation is not found in claim 4.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments with respect to claims 1-7, 35-37, and 65 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard S. Liang whose telephone number is (571) 272-2148. The examiner can normally be reached on 8:30-5 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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MS 7/18/05
MANISH S. SHAH
PRIMARY EXAMINER